Final Anchovy TAC for 2019, Using OMP-18

C.L. de Moor*

Correspondence email: *carryn.demoor@uct.ac.za*

Following the recruit survey results, the anchovy TAC for 2019 is revised to a final value of 350 000t.

Following the recent 2019 recruit survey, the revised 2019 South African anchovy TAC is to be recommended. The following data have been used:

1) November 2018 survey estimate of anchovy biomass: 1 559 546 tonnes.
2) June 2019 survey estimate of anchovy recruitment: 270.32 billion.
3) Time after 1 May that the survey commenced: 1.200 months (survey commenced on 7th June)
4) Anchovy recruit catch from 1st November to 6th June, using monthly cut-off lengths from de Moor *et al*. 2012 and assuming recruit cut-off lengths of 9cm for April to June: 7.657 billion
5) Anchovy adult catch from 1st November to 6th June, using monthly cut-off lengths from de Moor *et al*. 2012 and assuming cut-off lengths of 9cm for April to June: 6.099 billion
6) Directed anchovy TAC for 2018: 315 242 tonnes.

Using the above data, the final 2019 anchovy TAC recommendation was calculated by OMP-18 (de Moor 2018) to be:

Final anchovy TAC: 350 000 tonnes

The equations used to calculate this TAC are given in the Appendix. The final anchovy TAC was subject to the maximum TAC constraint of 350 000t. The Critical Biomass metarule was not applied.

No revision to the ≤14cm sardine TAB with anchovy fishing is undertaken this year given Exceptional Circumstances have been declared for sardine and sardine TAC and TABs for 2019 were calculated on an ad-hoc basis.

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References

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* MARAM (Marine Resource Assessment and Management Group), Department of Mathematics and Applied Mathematics, University of Cape Town, Rondebosch, 7701, South Africa.

de Moor CL. 2018. The 2018 Operational Management Procedure for the South African sardine and anchovy resources. Department of Agriculture, Forestry and Fisheries: Branch Fisheries Document FISHERIES/2018/DEC/SWG-PEL/37.

Appendix: Summary of final anchovy TAC equations of OMP-18 (from de Moor 2018).

The revised anchovy TAC is initially calculated as:

$$TAC^A_{2019} = \alpha q \left(p \frac{N^A_{2018,0}}{\bar{N}^A_0} + (1-p) \frac{B^{obs,A}_{2018}}{\bar{B}^A_{Nov}} \right)$$

This results in $TAC^A_{2019} = 743\,181$. As the anchovy TAC in 2018 was below the 2-tier threshold of 330 000t, this TAC is subject to the following constraints:

$$max\{TAC^A_{2019,init}; (1 - c^A_{mxdn})TAC^A_{2018}; c^A_{mntac}\} \leq TAC^A_{2019} \leq c^A_{mxtac}$$

which results in $TAC^A_{2019} = 350\,000$. The anchovy biomass projected for November 2019 is above the Exceptional Circumstances threshold and thus no Exceptional Circumstances provisions were invoked. In addition the projected November 2019 biomass is above 700 000t, and thus no smoothing is applied. In the above equations we have:

$B^{obs,A}_y$ - the estimate of anchovy abundance (in thousands of tonnes) from the hydroacoustic biomass survey in November of year y.

$\bar{B}^A_{Nov}$ - the historical average index of anchovy abundance from the biomass surveys from November 1984 to November 1999, of 1 380.28 thousand tonnes.

$N^A_{2018,0} = \left(N^{obs,A}_{2019} e^{t_{2019} \times 1.2/12} + C^A_{2019,0bs}\right) e^{6 \times 1.2/12} = 569.306$

- the simulated estimate of anchovy recruitment from the recruitment survey in 2019, $N^{obs,A}_{2019}$, back-calculated to 1 November 2018 by taking natural and fishing mortality into account.

$\bar{N}^A_0 = 221.8$ - the average 1985 to 1999 survey estimate of anchovy recruitment (in billions) in May/June, back-calculated to November of the previous year.

$\alpha = 1.16$ - a control parameter which scales the anchovy TAC to meet target risk levels for sardine and anchovy.

$p = 0.7$ - the weight given to the recruit survey component compared to the biomass survey component in setting the anchovy TAC.

$q = 300$ - reflects the average annual TAC expected under OMP99 under average conditions if $\alpha = 1$.

$c^A_{mxdn} = 0.25$ - the maximum proportional amount by which the directed anchovy TAC can be reduced from one year to the next.

$c^A_{mntac} = 120$ - the stable directed TAC (in thousands of tonnes) that may be set for anchovy.

$c^A_{mxtac} = 450$ - the maximum directed TAC (in thousands of tonnes) that may be set for anchovy.

$c^A_{tier} = 330$ - 2-tier threshold for directed anchovy TAC

$TAC^A_{2019,init} = 347.860$ - the initial anchovy TAC for 2019

$C^A_{2019,0bs} = 7.657$ - the observed juvenile anchovy landed by number (in billions) from the 1st of November 2016 to the day before the recruit survey commenced in 2019.

$t_{2019} = 1.200$ - the timing of the anchovy recruit survey in 2019 (number of months) relative to the 1st of May.